

## Ethnomedicinal rhizomes of Ranchi district of Jharkhand used as anti-urolithiatic (kidney-stone) and anti-cholelithiatic (gall-stone) agents

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### ABSTRACT

Rhizomes are important underground modified stems, meant for perennation and food storage in plants. They have major bioactive compounds (mainly in aromatic rhizomes), thus, used in therapeutics. Ethnomedicinal rhizomes found in Ranchi District of Jharkhand are also being used traditionally by the endemic-ethnic tribe in their herbal preparations to cure many diseases, especially in the management of urolithiasis (kidney-stone) and cholelithiasis (gall-stone). Urolithiasis and cholelithiasis are lifestyle diseases, their frequency of occurrence and recurrence is very high in the society. About 12% of world population are the sufferers. Modern medicines and surgery are costly steps with many side effects and no definite cure. The present work was carried out through survey-study in consultation with many Baidyas, Allopathic doctors, Knowledgeable persons and the lithiatic patients. Here 7 widely used ethnomedicinal rhizomes are presented, belonging to 3 Botanical families (Zingiberaceae, Cyperaceae and Nelumbonaceae) and 6 genera. These rhizomes are rich in phytochemicals, especially flavonoids and phenolics. Some of them are starchy and non-aromatic. They all possess many therapeutic properties such as antioxidant, immunomodulator, carminative, anti-inflammatory, antipyretic, antimicrobial, anti-ulcerative, antidiabetic, hepatoprotective, diuretics, etc. Rhizomes are good source of spice, tonic and perfume. Rhizomes of *Curcuma Longa* L. (Turmeric) and *Zingiber officinalis* Roscoe (ginger) are used in culinary as spices for marvelous taste, aroma and colour, whereas rhizomes of *Nelumbo nucifera* Gaertn is a royal vegetable. The aim of this study is to explore the much valuable traditional classic knowledge of the rhizomes in the successful management of urolithiasis and cholelithiasis, which will lead the further study.

**Key Words** - Ethnomedicinal rhizomes, urolithiasis, cholelithiasis, Zingiberaceae

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### INTRODUCTION

District Ranchi of Jharkhand state is situated in the lap of river Subarnarekha and its tributaries. This is a plateau region lying between the geographical coordinates- 23°15'N to 23°25' N latitude and 85°15' to 85°24' longitude with an average elevation of 651m above the sea-level, composing the area of 7698km<sup>2</sup>. The hilly topography and

subtropical climate of Ranchi district creates the quintessential natural bounty and a rich biodiversity, which cradles basket-full of medicinal plants. The local endemic-ethnic communities used their traditional knowledge based on plants and plant-parts, to cure various ailments over the years. Their time-honored traditions are inseparable from

their livelihood. Dependence on local flora is the main characteristic of indigenous ethnic people, this leads to biodiversity conservation, too. They use different rhizomes of various plants. The Baidyas or traditional healers cure many infectious and non-infectious diseases successfully such as malaria, typhoid, diabetes, hypertension, arthritis, asthma, paralysis, liver-ailments, kidney-stone, gall-stone, etc. by their herbal preparations, also included different rhizomes.

Rhizomes of angiospermic plants are mostly belong to family Zingiberaceae (Zinger-family). The native of Zinger-family is India. Rhizomes are modified underground stems, having nodes and internodes, prostrate, thickened, grow horizontally under the surface of soil, axillary buds present at the nodes and adventitious roots are given off from its lower side. Their shape and structure are uneven; some are round, ovoid, pear-shaped, while, some are thickened branched or unbranched; fleshy or fibrous and so on. They are meant for perennation and storage of food. As rhizomes are perennating body, thus, they have stored food materials, like, starches, proteins and other nutrients. They are rich in phytochemicals and essential oil. These modified stems have their roots in culinary, medicinal and spiritual practices in various region of India. For medicinal purpose, rhizomes are collected at the end of vegetative period, i.e. usually in the autumn. The therapeutic use of some Rhizomes is dated back to those ancient times when there was no prior knowledge of their active components. These features are well appreciated and recognized by the Endemic-ethnic people of Ranchi district as they use to prepare herbal preparations of rhizomes against urolithiasis and cholelithiasis very purposefully.

Stone diseases are very common in human beings since time immemorial; this had also been traced in Indus Valley Civilization. In AYURVEDA, it is described as ASHMARI – MUTTASHMARI for Kidney-stone and PITTASHMARI for Gall-stone. These are very common, worldwide and painful stone diseases; caused due to metabolic imbalance of promoters and inhibitors in body; associated

with various risk factors such as erratic lifestyle, unhealthy diets, less daily fluid intake, geographic and genetic conditions, low physical work, etc. Kidney-stones are composed of Calcium oxalate, Calcium phosphate, Uric acid, Struvite and Cystine; whereas, Gall-stones are of Cholesterol, Pigment and Biliary sludge- they exist either solitary or, mixed type. Modern treatment involves surgical removal of stones and synthetic medication, which creates a lot of side-effects and recurrence in case of urolithiasis.

Ethnomedicinal rhizomes have miraculous effect in the management of Urolithiasis and Cholelithiasis; they significantly prevent the rise in calcium, oxalate, uric acid and inorganic phosphate (promoters) and increase the levels of magnesium and citrate (inhibitors). Some rhizomes, which have antilithiatic, diuretic and antiuropathogenic properties, are collected and studied in this research work.

#### **MATERIAL AND METHOD**

A field survey-study of Ranchi district was conducted to explore the ethnomedicinal use of rhizomes of various plants among the local tribes, Baidyas, knowledgeable persons, etc. The meetings with Allopathic doctors (MBBS) resulted the complete description of the diseases- Urolithiasis and Cholelithiasis; which included their cause, various risk factors, symptoms, diagnosis and treatment. Interviewed the Baidyas, knowledgeable persons and local healers as well as the lithiatic patients with the help of standard questionnaires related to their herbal treatment. On the basis of this, 7 ethnomedicinal rhizomatic plants of 3 families and 6 genera were purposefully selected. The plant specimens were collected and photographed; authentication of these plants was done in 2-levels. First, by the help of local knowledgeable persons for local name, identity and use; and second, for their Botanical identity, followed the flora of 'Botany of Bihar and Orissa', by H.H. Haines and Taxonomy Department of University Department of Botany, Ranchi University, Ranchi.

**RESULT**

Our survey on the use of anti-lithiatic rhizomes of medicinal plants by tribes and local inhabitants of

Ranchi district revealed the following information, also included the therapeutic use of rhizomes :

**Table 1: Ethnomedicinal Rhizomatous Plants Description**

S. No.	Botanical Name	Family	Vernacular Name	English Name	Ayurvedic Name	Habit/Habitat
1.	<i>Alpinia galanga</i> (L.) Willd.	Zingiberaceae	Kulanjan, sugandha bach	Galangal, Thai ginger	Kulanjana	Terrestrial, perennial, shrub
2.	<i>Curcuma caesia</i> Roxb.	Zingiberaceae	Nil-kuntha, Kali haldi	Blue ginger	Narkachur	Terrestrial, perennial, herb
3.	<i>Zingiber officinale</i> Roscoe.	Zingiberaceae	Adrak(fresh) Shunthi(dried)	Ginger	Adraka	Terrestrial, perennial, herb
4.	<i>Curcuma longa</i> L.	Zingiberaceae	Haldi	Turmeric	Haridra	Terrestrial, perennial, herb
5.	<i>Cyperus rotundus</i> L.	Cyperaceae	Nagar-motha	Nutgrass	Musta	Terrestrial, perennial, herb
6.	<i>Actinoscirpus grossus</i> (L.F.) Goetgh. & D.A. Simpson	Cyperaceae	Kesor, Kesurkanda	Giant bur rush	Kasheruk	Aquatic, perennial, herb
7.	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	Kamal	Lotus	Padma	Aquatic, perennial, herb

**Table 2 : Ethnomedicinal Rhizomes Description**

S. No.	Botanical Name	Rhizome colour and aroma	Phytochemical constituents	Property	Traditional use of rhizomes
1.	<i>Alpinia galanga</i> (L.)Willd.	Reddish brown- outside; Orange yellow- inside; Aromatic	Flavonoids, galangin, alpinin, sesquieolignan, cineole, diterpenoids, camphor, etc.	Antioxidant, Carminative, aphrodisiac, febrifuse, bronchodilator, diuretic	Fresh juice and dried powder
2.	<i>Curcuma caesia</i> Roxb.	Brown- ouside; Greyish blue- inside; Aromatic	Flavonoids, steroids, terpenoides, alkaloides, camphor, ar-curcumene, anthocyanin, etc.	Antioxidant, antimicrobial, antifungal, anti-inflammatory, antipyretic, analgesic, diuretic, anticancer, etc.	Fresh paste, dried powder and rhizome essential oil
3.	<i>Zingiber officinale</i> Roscoe.	Brown- outside; Brownish yellow- inside; Aromatic	Phenolics- gingerols (in fresh ginger), shogaols (in dried ginger), paradols (in hydrogenated form of dried ginger)	Antioxidant, anti-inflammatory, immunomodulator, speed up metabolism, detoxifyer, relaxant, antimicrobial, warming effect, etc.	3-4gm /day- dose of raw ginger; ginger water in the morning; fresh, juice, paste, dried, powder; ginger oil; spice & herbal medicine; culinary; etc.
4.	<i>Curcuma longa</i> L.	Light brown- outside; Golden Yellow- inside	Curcumin, Demethoxycurcumin, Curcuminoids, etc.	Antioxidant, anti-inflammatory, immunomodulatory, etc.	Culinary, Classical Indian Medicine, dye, indicator of acidity and alkalinity, herbal tea, golden milk, fresh raw paste, dry powder, etc.
5.	<i>Cyperus rotundus</i> L.	Black- outside; White- inside	Flavonoids, Sesquiterpenes, Terpenoids, Rotundene, $\alpha$ -Cyperone, Cyperene, $\alpha$ -Selinene, etc.	Antioxidant, neuroprotective, cardioprotective, hepatoprotective, antidiabetic, analgesic, etc.	Raw paste, dry powder, etc.
6.	<i>Actinoscirpus grossus</i> (L.F.) Goetgh. & D.A. Simpson	Black- outside; Whitish grey- inside	Flavonoids, Coumarins, Steroids, Tannins, Terpenoid, etc.	Antidiarrheal, anti-emetic, liver tonic, astringent, hepatoprotective, etc.	Raw, dried powder, flour, etc.
7.	<i>Nelumbo nucifera</i> Gaertn.	Brown beige- outside; Off white- inside	Flavonoids, Alkaloids, Phenolics, Vitamins, etc.	Antioxidant, anti-inflammatory, antipyretic, antidiabetic, hypoglycemic, psychopharmacological, etc.	Boiled, sliced, fried, cooked- as vegetables, in soup, pickled in vinegar, dried flour, lotus root tea.



Fig.1- *Alpinia galanga* (L.) Willd.



Fig.2- *Curcuma caesia* Roxb.



Fig.3- *Zingiber officinale* Roscoe.



Fig.4 - *Curcuma longa* L.



Fig.5- *Cyperus rotundus* L.



Fig.6- *Actinoscirpus grossus* (L.F.)  
Goetgh. & D.A. Simpson



Fig.7- *Nelumbo nucifera* Gaertn.

## CONCLUSION

This study about ethnomedicinal rhizomatous plants suggests that rhizomes are very useful in herbal preparations for medicines and are also the great source of various bioactive phytochemicals. Rhizome oil, extracted from aromatic rhizomes, contains ar-curcumene,  $\alpha$ -zingiberene,  $\beta$ -bisabolene,  $\beta$ -sesquiphellandrene, turmerone, etc. and thus, have therapeutic potential to cure and

manage Urolithiasis (Kidney-stone) and Cholelithiasis (Gall-stone) in the sufferers along with other ailments, too. The Baidyas or Traditional healers or Endemic-ethnic people of Ranchi district got success in the management of these stone-diseases by using ethnomedicinal rhizomes. Among the 7 rhizomes of 3 families, all are aromatic in nature except, the rhizomes of *Nelumbo nucifera*

Gaertn. (Kamal-kakri) and *Actinoscirpus grossus* (L.F.) Goetgh. & D. A. Simpson (Kesor), which are used as vegetable and raw or flour, respectively, as they are starchy. Rhizomes have very unique and different properties than other plant-parts. They are used as major food source, *Zingiber officinale* Roscoe. ginger) and *Curcuma longa* L.(turmeric) are being used regular in cooking as spices for flavour and colour. The curcumene-content of turmeric makes it superfood of golden colour, for its anti-inflammatory properties. Ginger is rich in terpenes; it is Gingerol in fresh condition, which transforms into Shogaol in dried form, which again transforms into Paradol after hydrogenation of dried ones. Antioxidant property of dried form is greater than the fresh one. Galangal rhizome is used in medicine and flavoring. Besides medicinal values of *Curcuma caesia* Roxb., it is very auspicious spiritually.

The bioactive contents of the selected rhizomes represent a promising and innovative source of many ethnomedicinal drugs to cure Urolithiasis and Cholelithiasis.

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